



## Vocabulary

### Review

- Underline the correct word to complete the sentence.

If two triangles are *congruent*, corresponding angle measures are the same/  
different and corresponding side lengths are the same/ different.

- A *transformation* is a change in form or appearance.  
Which picture does not show a transformation of the soccer ball?



A.



B.



C.



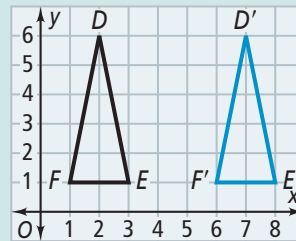
### Vocabulary Builder

**translation** (noun) truh anz lay shuh n

**Related Words:** transformation, slide, preimage, image

**Main Idea:** A **translation** describes how a figure in a coordinate plane is slid from one place to another.

**Example:** Each point in  $\triangle DEF$  was moved 5 units to the right.  $\triangle D'E'F'$  is a **translation** of  $\triangle DEF$ .



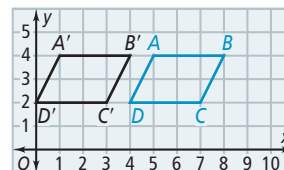
### Use Your Vocabulary

- Tell whether the pair of figures shows a translation. Write *yes* or *no*.



- In what direction is the translation of figure  $ABCD$ ?

- How many units has figure  $ABCD$  been translated?



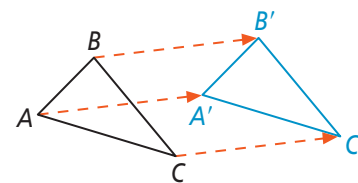
## Key Concept Translation

A **translation** is a transformation that maps all points of a figure the same distance in the same direction.

You write the translation that maps  $\triangle ABC$  onto  $\triangle A'B'C'$  as  $T(\triangle ABC) = \triangle A'B'C'$ . A translation is a **rigid motion** with the following properties:

If  $T(\triangle ABC) = \triangle A'B'C'$ , then

- $AA' = BB' = CC'$
- $AB = A'B', BC = B'C', AC = A'C'$
- $m\angle A = m\angle A', m\angle B = m\angle B', m\angle C = m\angle C'$



Circle the correct word in each statement.

- Translations move **some / all** points in a figure the same distance, in the same direction.
- Translations **change / preserve** side lengths of the figure.
- Translations **change / preserve** angle measures of the figure.

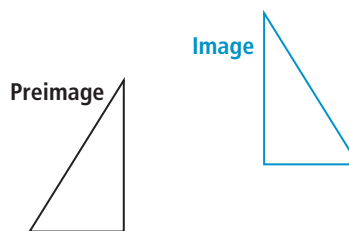


### Problem 1 Identifying a Rigid Motion

Transformation A



Transformation B



**Got It?** Does the transformation appear to be a rigid motion?

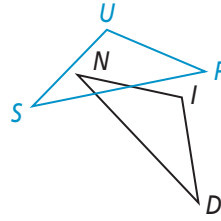
- Compare the corresponding sides of the preimage and image. Are they equal in length?  
Transformation A: **yes no**                      Transformation B: **yes no**
- Compare the corresponding angles of the preimage and image. Are they equal in measure?  
Transformation A: **yes no**                      Transformation B: **yes no**
- A rigid motion preserves side lengths and angles measures of the preimage.  
Transformation A: **is / is not** a rigid motion.  
Transformation A: **is / is not** a rigid motion.



## Problem 2 Naming Images and Corresponding Parts

In the diagram,  $\triangle NID \rightarrow \triangle SUP$ .

**Got It?** What are the images of  $\angle I$  and point  $D$ ?  
What are the pairs of corresponding sides?



13. Use the position of the letters in the transformation statement  $\triangle NID \rightarrow \triangle SUP$ .

a. Angle  $I$  is in the 2nd position in  $\triangle NID$ . The angle in the 2nd position for  $\triangle SUP$  is  $\angle$  .

b. Point  $D$  is in the 3rd position in  $\triangle NID$ . The point in the 3rd position for  $\triangle SUP$  is point .

14. Name the three pairs of corresponding sides using  $\triangle NID \rightarrow \triangle SUP$ .

$\overline{NI}$  and   $\overline{ID}$  and   $\overline{ND}$  and



## Problem 3 Finding the Image of a Translation

**Got It?** What are the images of the vertices of  $T_{\langle 1, -4 \rangle}(\triangle ABC)$ ?  
Graph the image of  $\triangle ABC$ .

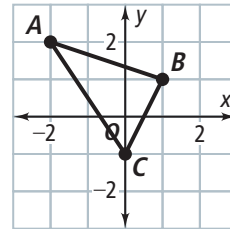
15. Identify the coordinates of the vertices of  $\triangle ABC$ .

$A(\text{ }, \text{ })$   $B(\text{ }, \text{ })$   $C(\text{ }, \text{ })$

16. Describe the translation rule,  $T_{\langle 1, -4 \rangle}$ .

Add  to each  $x$ -value.

Subtract  from each  $y$ -value.



17. Use the rule to find the coordinates of the vertices of the image.

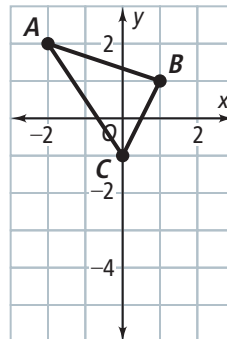
$T_{\langle 1, -4 \rangle}(A) = (\text{ } + 1, \text{ } - 4)$ , or  $A'(\text{ }, \text{ })$ .

$T_{\langle 1, -4 \rangle}(B) = (\text{ } + 1, \text{ } - 4)$ , or  $B'(\text{ }, \text{ })$ .

$T_{\langle 1, -4 \rangle}(C) = (\text{ } + 1, \text{ } - 4)$ , or  $C'(\text{ }, \text{ })$ .

18. Plot the points  $A'$ ,  $B'$ , and  $C'$ .

Connect the points to form  $\triangle A'B'C'$ .





## Problem 4 Writing a Rule to Describe a Translation

**Got It?** The translation image of  $\triangle LMN$  is  $\triangle L'M'N'$  with  $L'(1, -2)$ ,  $M'(3, -4)$ , and  $N'(6, -2)$ . What is a rule that describes the translation?

19. Choose a pair of corresponding vertices.

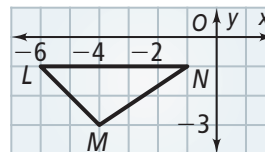
$$L(\text{ }, \text{ }) \quad L'(1, -2)$$

20. Find the horizontal change and the vertical change.

$$1 - (\text{ }) = \text{ } \rightarrow x + 7$$

$$-2 - (\text{ }) = \text{ } \rightarrow y - 1$$

21. The translation maps  $(x, y)$  to  $(\text{ }, \text{ })$ . The translation rule is  $T_{\langle \text{ }, \text{ } \rangle}(LMN)$ .



## Lesson Check • Do you UNDERSTAND?

**Error Analysis** Your friend says the transformation  $\triangle ABC \rightarrow \triangle PQR$  is a translation. Explain and correct her error.

22. Identify the corresponding vertices in the statement  $\triangle ABC \rightarrow \triangle PQR$ .

A and

B and

C and

23. Identify the corresponding vertices from the diagram.

A and

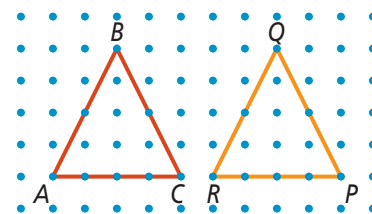
B and

C and

24. What was your friend's error? Explain.

25. Write the correct transformation statement.

$$\triangle ABC \rightarrow \triangle \text{$$



## Math Success

Check off the vocabulary words that you understand.

☐ rigid motion

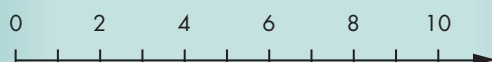
☐ preimage

☐ image

☐ translation

Rate how well you can use the properties of reflections.

Need to review



Now I get it!